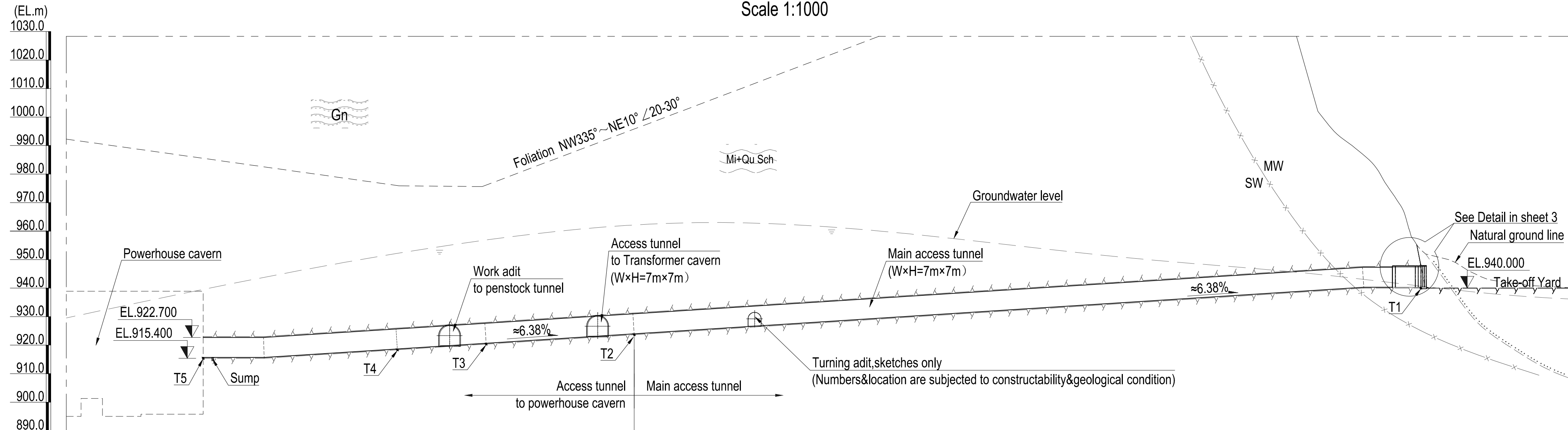


LONGITUDINAL PROFILE OF ACCESS TUNNEL (TO POWERHOUSE CAVERN)

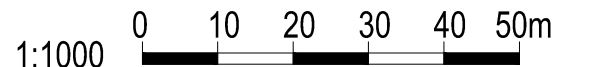
Scale 1:1000



NOTE

- All dimensions are in millimeters, and coordinates, chainages & elevations are in meters.
- The excavation and support methods can be adjusted according to the actual situation after the geological conditions are revealed.
- It is evident that the maximum unsupported span is a guideline, only, and needs continuous adjustment to the prevailing rock conditions and construction requirements at the spot.
- The cylinder specified compressive strength of tunnel shotcrete and cement mortar at 28 days of age is 25MPa.
- The specified compressive strength of concrete is the cylinder strength at age of 28 days.
- The yield strength and of steel is 250MPa.
- Rust preventive compound will be sprayed on exposed surface of steel structure.
- Symbol description:
 - A-Line is the design excavation line.
 - B-Line is the overbreak line.
 - R denotes round bar, yield strength of the round bar is 280MPa.
 - D denotes deformed bar, yield strength of the deformed bar is 500MPa;
- The forepoling is mainly used in the tunnel section with poor surrounding rock geology, which should be used together with dowel and steel support (or lattice girder), and the spacing of dowel should be consistent with that of steel support.
- The detail of weep holes, rock dowel, steel support and steel lattice girder see the drawing No. UT1-C-000-CVL-DG-40001.
- The end position of the access tunnel may be adjusted according to the final design of the powerhouse.
- The steel support (or lattice girder) to rock class V / IV is subjected to the exposed geological condition.
- See subsequent drawings for concrete structure and reinforcement.

Scale:



REFERENCE DRAWINGS

UT1-C-090-CVL-DG-64001	SURROUNDING ROCK STABILITY CALCULATION OF ACCESS TUNNEL FOR POWERHOUSE
UT1-C-090-CVL-DG-64001	LAYOUT OF ACCESS TUNNEL TO POWERHOUSE

SYMBOL AND LEGEND

FOR APPROVAL

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE PRELIMINARY FOR APPROVAL. IT CAN BE CHANGED IN THE EXECUTION STAGE. THIS DRAWING IS THE PROPERTY OF DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD. IT IS NOT TO BE COPIED OR USED IN ANY WAY DETRIMENTAL TO THE COMPANY.

OB	06.MAY.2022	Second issue	WANG X.H.	ZHANG J.Q.	LI W.G.
OA	28.JUL.2021	First issue	ZHANG J.Q.	WANG H.Q.	LIU Y.Z.
REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.

PROJECT TITLE

Upper Trishuli-1 HEP (216MW)

OWNER



OWNER'S ENGINEER



CONTRACTOR

DOOSAN Enerbility

DRAWING TITLE

EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE (1 / 6)

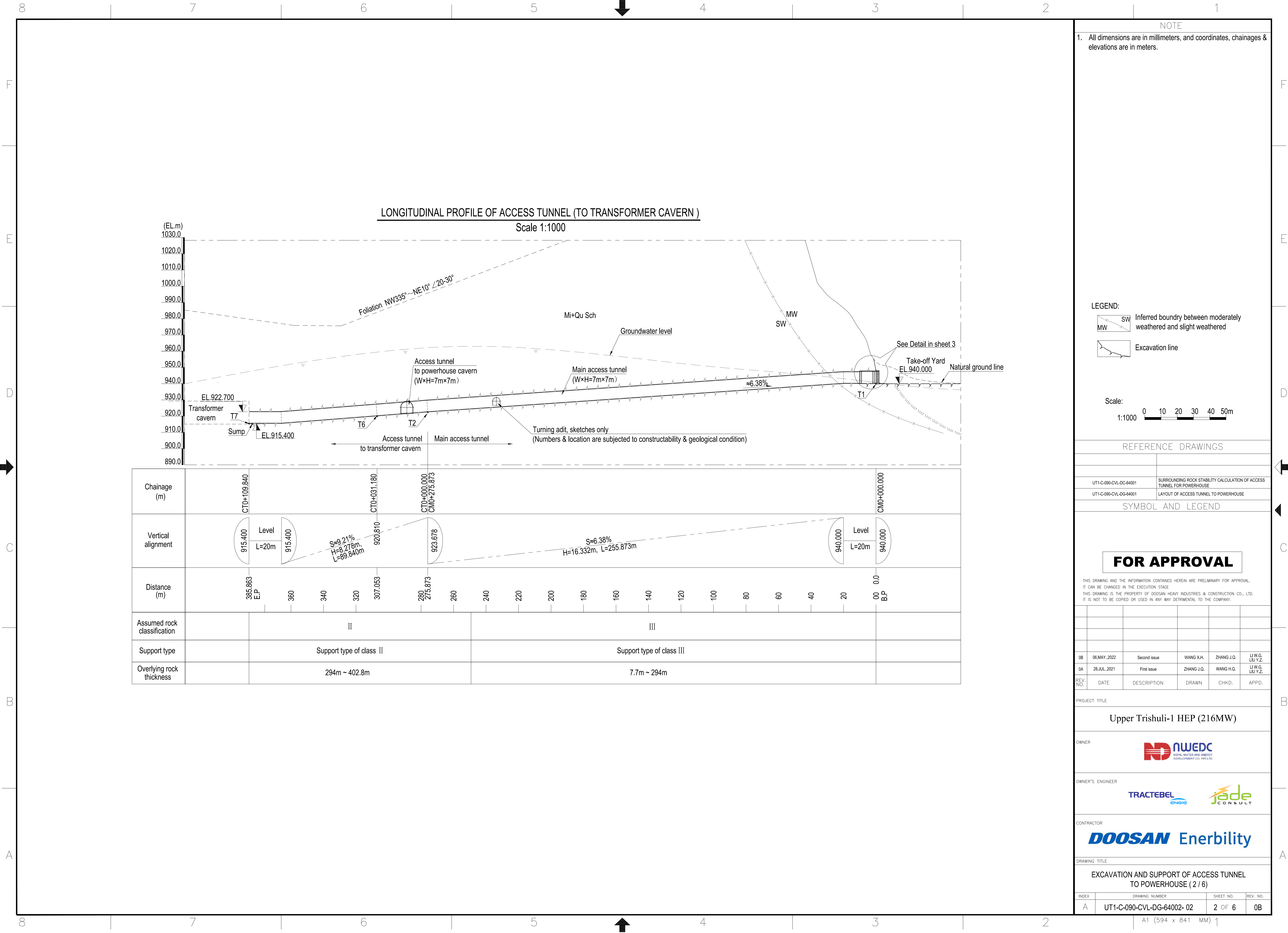
INDEX	DRAWING NUMBER	SHEET NO.	REV. NO.
A	UT1-C-090-CVL-DG-64002- 01	1 OF 6	0B

A1 (594 x 841 MM) 1

TUNNEL SUPPORT PATTERN

Rock mass quality	40≥Q	10≤Q<40	4≤Q<10	1≤Q<4		Q<1
Support type	I	II	III	IV (Without steel support)	IV (With steel support)	V Same as type IV (With steel support)
Inner dimension(m)	W=7m, H=7m					
	Excavation Parameter					
ESR	1.3	1.3	1.3	1.3		1.3
Excavation span(m)	3	3	2	1.5		0.5~1
Calculated MUS*(m)	11	9	5	3		1
MUS* for shotcrete application(m)		9	2	1.5		1
MUS* for rock dowel installation(m)		6	4	3		0.5~1
MUS* for steel support installation(m)				0.5~1.0		0.5~1
Excavation method	Blasting			Blasting/mechanically		Mechanically
Initial support parameters						
where necessary						
Weep hole Φ45mm,L=0.5m / 0.8m						For class V rock, the same support scheme as class IV rock can be adopted after grouting is used to improve the integrity and firmness of surrounding rock.
Plastic fiber shotcrete,f _c =25MPa	T=50mm	T=50mm	T=100mm	T=100mm	T=160mm	
Rock dowel D25,L=3m,alternately	Spot	Spot	@2m×2m	@1.5m×1.5m	@1.0m×1.0m	
Steel support, MB150 (or lattice girder)					@1m	
Forepoling grouted dowel,D25mm, @400mm, L=6m					where necessary	
*MUS , Maximum Unsupported Span.						

For class V rock, the same support scheme as class IV rock can be adopted after grouting is used to improve the integrity and firmness of surrounding rock.



NOTE

1. All dimensions are in millimeters, and coordinates, chainages & elevations are in meters.

LEGEND:

SW Inferred boundary between moderately weathered and slight weathered

MW Excavation line

Scale:

1:1000 0 10 20 30 40 50m

REFERENCE DRAWINGS

UT1-C-090-CVL-DC-64001	SURROUNDING ROCK STABILITY CALCULATION OF ACCESS TUNNEL FOR POWERHOUSE
UT1-C-090-CVL-DG-64001	LAYOUT OF ACCESS TUNNEL TO POWERHOUSE

SYMBOL AND LEGEND

FOR APPROVAL

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE PRELIMINARY FOR APPROVAL. IT CAN BE CHANGED IN THE EXECUTION STAGE. THIS DRAWING IS THE PROPERTY OF DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD. IT IS NOT TO BE COPIED OR USED IN ANY WAY DETRIMENTAL TO THE COMPANY.

OB	06.MAY.2022	Second issue	WANG X.H.	ZHANG J.Q.	LI W.G. LIU Y.Z.
OA	28.JUL.2021	First issue	ZHANG J.Q.	WANG H.Q.	LI W.G. LIU Y.Z.
REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.

PROJECT TITLE

Upper Trishuli-1 HEP (216MW)

OWNER

NWEDC

OWNER'S ENGINEER

TRACTEBEL ENGIE jade CONSULT

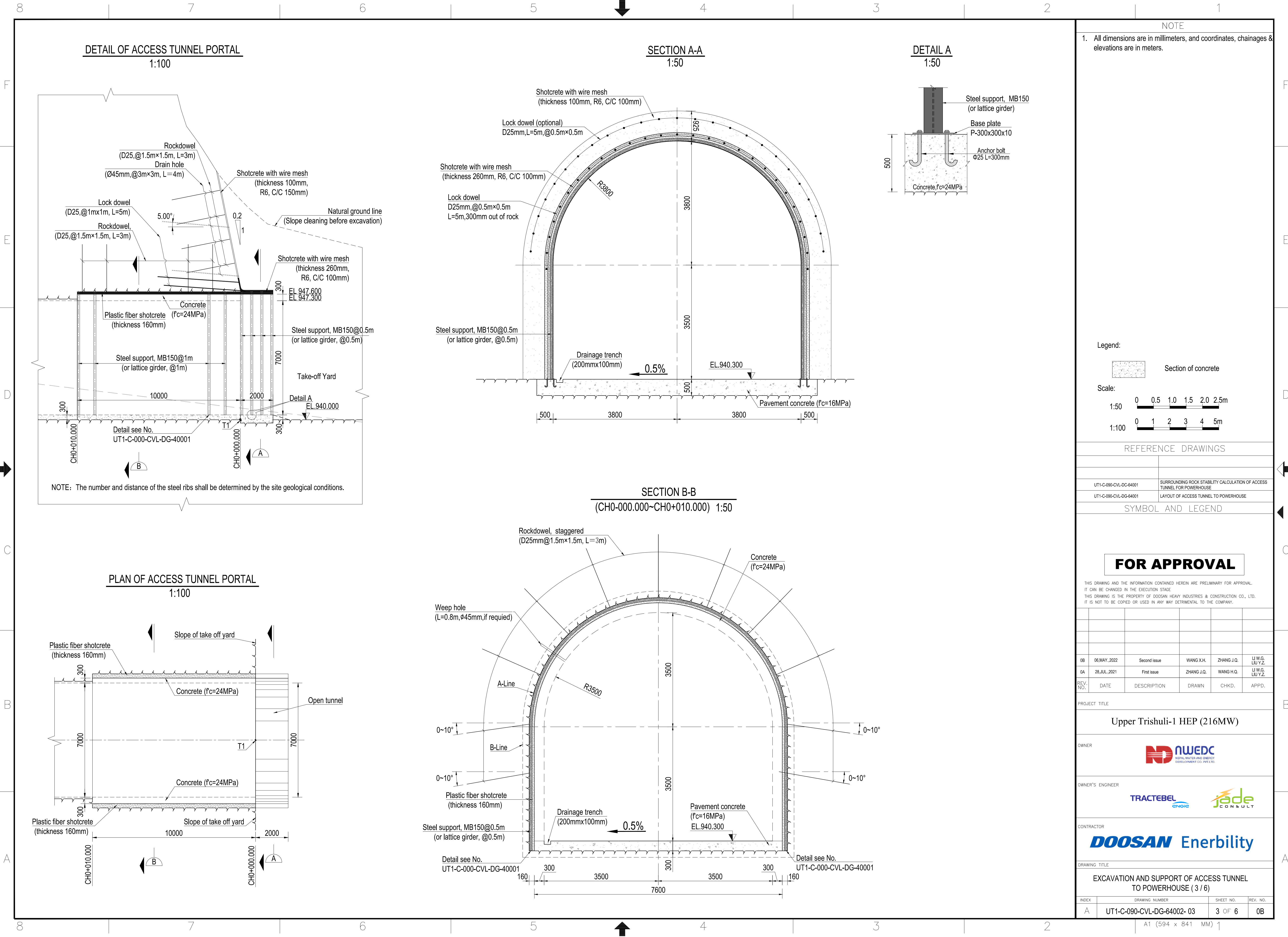
CONTRACTOR

DOOSAN Enerbility

DRAWING TITLE

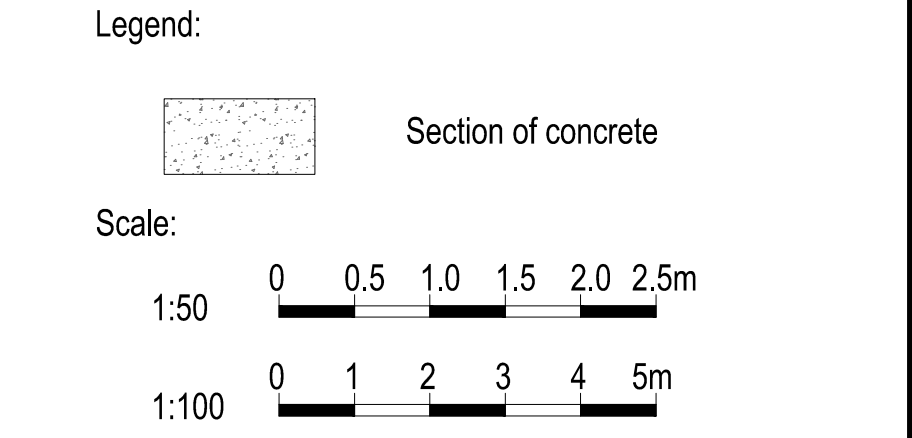
EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE (2 / 6)

INDEX	DRAWING NUMBER	SHEET NO.	REV. NO.
A	UT1-C-090-CVL-DG-64002- 02	2 OF 6	0B



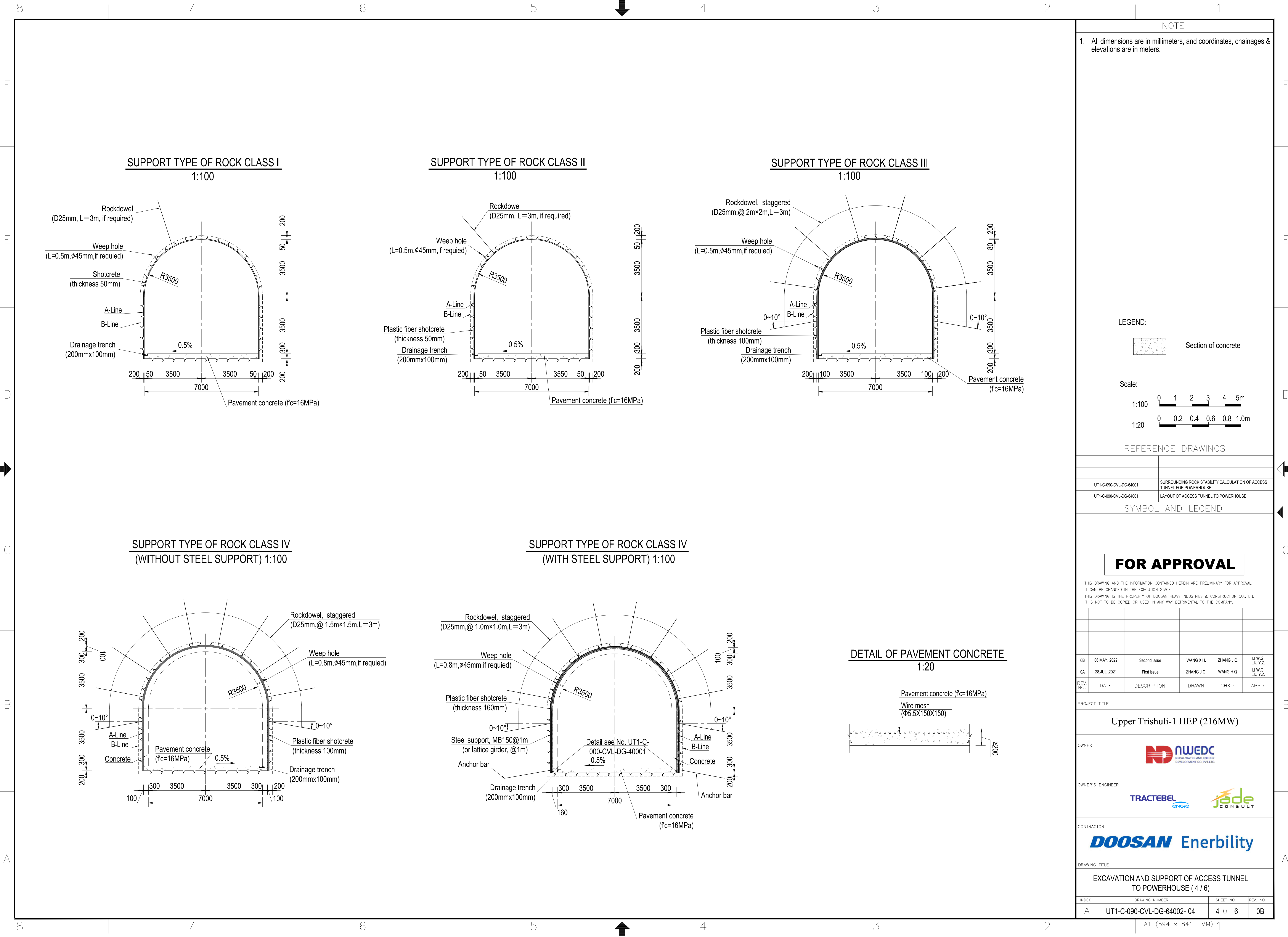
NOTE

1. All dimensions are in millimeters, and coordinates, chainages & elevations are in meters.



REFERENCE DRAWINGS	
UT1-C-090-CVL-DG-64001	SURROUNDING ROCK STABILITY CALCULATION OF ACCESS TUNNEL FOR POWERHOUSE
UT1-C-090-CVL-DG-64001	LAYOUT OF ACCESS TUNNEL TO POWERHOUSE
SYMBOL AND LEGEND	

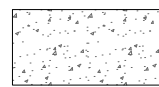
FOR APPROVAL				
THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE PRELIMINARY FOR APPROVAL. IT CAN BE CHANGED IN THE EXECUTION STAGE. THIS DRAWING IS THE PROPERTY OF DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD. IT IS NOT TO BE COPIED OR USED IN ANY WAY DETRIMENTAL TO THE COMPANY.				
OB	06.MAY.2022	Second issue	WANG X.H.	ZHANG J.Q.
OA	28.JUL.2021	First issue	ZHANG J.Q.	WANG H.Q.
REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.
PROJECT TITLE				
Upper Trishuli-1 HEP (216MW)				
OWNER				
OWNER'S ENGINEER				
CONTRACTOR				
DRAWING TITLE				
EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE (3 / 6)				
INDEX	DRAWING NUMBER	SHEET NO.	REV. NO.	
A	UT1-C-090-CVL-DG-64002- 03	3 OF 6	OB	



NOTE

1. All dimensions are in millimeters, and coordinates, chainages & elevations are in meters.

LEGEND:



Section of concrete

Scale:

1:100 0 1 2 3 4 5m

1:20 0 0.2 0.4 0.6 0.8 1.0m

REFERENCE DRAWINGS




UT1-C-090-CVL-DG-64001	SURROUNDING ROCK STABILITY CALCULATION OF ACCESS TUNNEL FOR POWERHOUSE
UT1-C-090-CVL-DG-64001	LAYOUT OF ACCESS TUNNEL TO POWERHOUSE

SYMBOL AND LEGEND

FOR APPROVAL

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE PRELIMINARY FOR APPROVAL. IT CAN BE CHANGED IN THE EXECUTION STAGE. THIS DRAWING IS THE PROPERTY OF DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD. IT IS NOT TO BE COPIED OR USED IN ANY WAY DETRIMENTAL TO THE COMPANY.

REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.
0B	06.MAY.2022	Second issue	WANG X.H.	ZHANG J.Q.	LI W.G.
0A	28.JUL.2021	First issue	ZHANG J.Q.	WANG H.Q.	LI W.G.

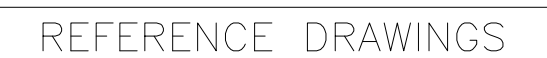
PROJECT TITLE			
Upper Trishuli-1 HEP (216MW)			
OWNER			
			
OWNER'S ENGINEER			
			
CONTRACTOR			
			
DRAWING TITLE			
EXCAVATION AND SUPPORT OF ACCESS TUNNEL TO POWERHOUSE (4 / 6)			
INDEX	DRAWING NUMBER	SHEET NO.	REV. NO.
A	UT1-C-090-CVL-DG-64002- 04	4 OF 6	0B

1:50

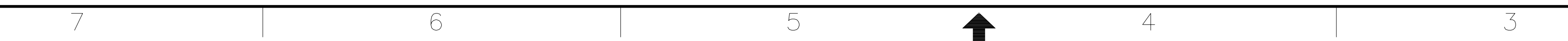
1:50

LEGEND:

Scale:



Scale 1:200



THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE PRELIMINARY FOR APPROVAL.
IT CAN BE CHANGED IN THE EXECUTION STAGE.

THIS DRAWING IS THE PROPERTY OF DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.
IT IS NOT TO BE COPIED OR USED IN ANY WAY DETRIMENTAL TO THE COMPANY.

08	06.MAY.2022	Second issue	WANG X.H.	ZHANG J.Q.	L.I.W.G. L.U.Y.Z.
0A	28.JUL.2021	First issue	ZHANG J.Q.	WANG H.Q.	L.I.W.G. L.U.Y.Z.
REV. NO.	DATE	DESCRIPTION	DRAWN	CHKD.	APPD.

PROJECT TITLE

Upper Trishuli-1 HEP (216MW)

OWNER

NWEDC
NEPAL WATER AND ENERGY
DEVELOPMENT CO. PVT. LTD.

OWNER'S ENGINEER

TRACTEBEL
ENGIE

jade
CONSULT

CONTRACTOR

DOOSAN Enerbility

DRAWING TITLE

EXCAVATION AND SUPPORT OF ACCESS TUNNEL
TO POWERHOUSE (5 / 6)

INDEX	DRAWING NUMBER	SHEET NO.	REV. NO.
A	UT1-C-090-CVL-DG-64002- 05	5 OF 6	0B

A1 (594 x 841 MM)	1
-------------------	---

